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| 22850 7590 03/03/2011 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | | |
| EXAMINER MONDT, JOHANNES P | | | | |
| ART UNIT 3663 | | PAPER NUMBER | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/551,902

Applicant(s)

BALLAGNY ET AL.

Examiner

JOHANNES P. MONDT

Art Unit

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 February 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 35-48 is/are pending in the application.
- 4a) Of the above claim(s) 37 and 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 35, 36 and 39-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-945)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 9, 2011, has been entered.

Response to Amendment

2. Amendment filed February 9, 2011, with said request for Continued Examination, forms the basis for this Office action. In said Amendment applicant cancelled claims 20, 21, 23-27, 29, 31 and 32, substantially amended claims 35-38 and added new claims 40-48. Claims 37 and 38 remain withdrawn. Comments on Remarks submitted with said Amendment are included under "Response to Arguments".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 35, 36, 39-41 and 44-48** are rejected under 35 U.S.C. 103(a) as being unpatentable over Travelli (US 4,720,370) (made of record by applicant in IDS filed on 2/1/2006, and previously cited) in view of Hooper et al (US 3,297,544) (previously cited).

On claims 35, 47 and 48: Travelli teaches a method for producing a nuclear fuel, comprising: producing wires 14 ("wire-like fissionable fuel members" 14: col. 3, l.47+), more than half being wires of fissile material (nuclear fuel 10) ("fuel containing plate structure", col. 3, l. 38-51) comprising:

disposing the wires in a casing 12 (matrix plate member 12: col. 3, l. 47+);

thus forming an assembly a plurality of wires 14 (plurality of continuous elongated wire-like fissionable fuel members; col. 3, l. 47-51),

wherein the assembly is contained inside casing (12), said casing being stainless and ductile, and compressed therein by said casing (col. 4, l. 56-62) and more than half of the number of wires are constituted by the fissile material (the wires are made of fissionable fuel (col. 3, l. 47+); therefore, the method includes deforming the casing with the assembly disposed therein so that the casing compresses the wires [the property "ductile" shows that the action of compression is counteracted by a casing that is deformable body, hence the casing is deformed in the method steps.

Travelli does not teach the limitation that the wires are stranded, braided or waved together.

However, it would have been obvious to include said limitation in view of Hooper et al, who, in a patent on nuclear fuel bearing bodies such as fuel elements for nuclear reactors (col. 1, l. 10-16), hence art analogous to Travelli, teach the fissile material in the form of nuclear fuel bearing compound or mixture 1b and, though the use of former 2 (col. 1, l. 70+; the analog of Travelli's casing) forming said fissile material in the form of elongated wires (circular cross section being one of the embodiments: see col. 3, l. 6+; see also Figures 1-2) and winding the lengths of said wires into a number of convolutions extending about a common axis, e.g., in the form of a multi-start helical winding, and e.g. with successive layers being wound oppositely handed (col. 1, l. 17-47), thus meeting "braided", "plaited", "stranded" and "weaved" (hence the further limitations of claims 47 and 48 are met), for the specific purpose of ensuring the entire outer surface of the length of the clad material around the fuel wire is available as heat transfer surface when swept by coolant (col. 3, l. 23-31).

Motivation to include the teaching by Hooper et al in the invention by Travelli flows directly from the improved heat transfer capability of the coolant process due to the braiding, plaiting, stranding, weaving of the fuel wires.

Combination of the teaching and the invention is straightforward, Hooper et al specifically pointing out how the braiding, stranding, plaiting, weaving can be accomplished with high expectation of success.

In said combination the nuclear fuel is produced by a method comprising: producing wires 14 more than half (in fact: all) being wires of fissile material; producing at least one assembly by stranding, braiding, or weaving said wires together ("together" interpreted as "closely and approximately parallel"); disposing the assembly in a stainless, ductile casing (casing 12 modified by the teaching of Hooper et al with former 2 as example); and deforming the stainless ductile casing with the assembly disposed therein so that the stainless, ductile casing compresses the wires (col. 4, l. 56-62).

On claim 36: the stainless ductile casing topologically is in the same class as a tube (see the combination of Figures 1 and 3). The specific shape of the casing in Hooper is a tube 2 (Hooper et al., col. 1, l. 71); applicant is also reminded that it has been held that a shape capable of performing the claimed function constitutes a case of *prima facie* anticipation. In re Schreiber, 128 F.3d at 1478, 44 USPQ2d at 1432. Furthermore, the casing comprises only one assembly (Figure 1), and the deforming includes drawing the stainless ductile casing by rolling (col. 2, l. 21-30 and col. 3, l. 59+).

On claim 39: the deforming is performed so that a cross-section shape of the wires is distorted from their original cross-section shape (inherent in the extrusion process: see col. 4, l. 63+), and such that the cross-sections of two adjacent wires fit together (i.e., they can be close together in approximate parallel alignment: see Figures 1-2 in Hooper et al., which, though the combination as defined above is the relevant reference).

On claim 40: neither Hoover nor Travelli necessarily teach the range limitation on the percentage of internal cross-section occupied by the gaps between the wires. However, said range limitation corresponds and implements a result-effective variable because, while the plate structure 10 affords "structural strength and ability to withstand intense neutron radiation" (col. 3, l. 38-46), Travelli also states (col. 4, l. 38): "It is advantageous to make the wire-like fissionable fuel members 14 with substantial cross-sectional dimensions, because making these dimensions large increases the uranium density of the plate structure 10". It is thus seen that the claimed percentage is a matter of routine optimization of uranium fuel density given a required structural strength and ability to withstand neutron radiation. Applicant's disclosure does not teach why the range as claimed is critical to the invention. In view of the absence of a teaching why a range is critical to the invention Applicant is reminded that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

On claim 41: the fissile material is uranium (Travelli, col. 3, l. 52+).

On claim 44: although neither Travelli nor Hooper teach the range limitation on a diameter of the wires defined by this claim, Travelli states that the dimensions of the nuclear fuel-containing plate structure 10 “may be widely varied” (col. 4, l. 21+). Wire width and thickness values provided by Travelli are only examples, and range from approximately 0.5 mm to 1.0 mm, or, in terms of microns: from 500 μm to 1,000 μm . As evidenced from the discussion by Travelli the cross-sectional dimensions of the wirelike members 14 is a matter of design choice, from which other parameters are derived or adjusted (see col. 4, l. 53-55). No criticality of the instant range limitation is apparent from the specification. In view of the absence of a teaching why a range is critical to the invention Applicant is reminded that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

On claim 45: all the wires of the assembly include fissile material because all members 14 are fissionable fuel members (col. 3, l. 52+).

On claim 46: the wires have identical values for their diameters (col. 4, l. 29-30).

4. **Claims 42-43** are rejected under 35 U.S.C. 103(a) as being unpatentable over Trvaelli and Hooper as applied to claim 41 above, and further in view of Thall et al (US 2,792,627). As detailed above, claim 41 is unpatentable over Travelli in view of Hooper. Neither Travelli nor Hooper necessarily teach the fissile material to be selected according to claims 42 or 43. However, apart from the fissile content assured b ythe uranium component, the alloys of uranium are selected for their malleability (see

Travelli, col. 3, l. 63+). As witnessed by Thall et al, metals of the chromium group, which include uranium and molybdenum, can be made malleable provided they include 20% of these metals, from which it is clear that UMo is a malleable uranium alloy, and hence would have been deemed an obvious material choice for the invention by Travelli. Applicant is reminded in this regard that it has been held that mere selection of known materials generally understood to be suitable to make a device, the selection of the particular material being on the basis of suitability for the intended use, would be entirely obvious. See MPEP 2144.07. Regarding claim 43, the limitation "including 8 % by mass of molybdenum" overlaps with the range by Thall referred to above. A *prima facie* case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art or when the ranges of a claimed composition do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. See MPEP 2144.05.

Response to Arguments

5. Applicant's arguments filed February 9, 2011, have been fully considered but they are not persuasive.

Applicant's argument in traverse alleging the outer tube in Hooper is not deformed in order to compress the wires is irrelevant to the rejection under 35 USC 103(a) of claim 35 because not Hooper but instead Travelli was cited for this limitation (see page 7, lines 7-10, of the prior Office action). Furthermore, page 5 of the Office action is irrelevant to the ground of rejection of claim 35, but only contains a portion of

the grounds of rejection of cancelled claim 20. Hooper is only cited for the limitation on "stranding, braiding or weaving the wires together". Regarding applicant's argument alleging that Travelli teaches the wire-like fuel members are separately confined in separate recesses, the ground of rejection was not based on Travelli teaching the wires to be stranded, waved or braided *together*, but instead Hooper is. Applicant's argument that the wires are "separately confined in separate recesses" is contradicted by the discussion of Figure 3, wherein the wires are shown in the same casing (plate member 12). Despite applicant's argument referring to a "recess" no such recess is claimed in the claim language, both independent and dependent claims, new or old. Applicant's traverse of the combination of Travelli with Hooper does not persuade of error for the following reason: In response to applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, all that is needed to arrive at the claimed invention, starting from Travelli, is a teaching, suggestion or motivation to include the limitation on "stranding, braiding or weaving said wires together". Hooper teaches this limitation (see page 8 of the Office action).

For the above reasons the amended claims stand rejected over the prior art of record. The new claims are being examined for the first and at the earliest possible time.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHANNES P. MONDT whose telephone number is (571)272-1919. The examiner can normally be reached on 8:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.